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HT-03-025/031

July 30, 2004

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Fr: George O. Saile, Reg. No. 19,572
28 Davis Avenue
Poughkeepsie, N.Y. 12603

Subject: Serial No. 10/849,310 05/19/04

Cheng T. Horng et al.

A NOVEL BUFFER (SEED) LAYER FOR MAKING A HIGH-PERFORMANCE MAGNETIC TUNNELING JUNCTION MRAM

INFORMATION DISCLOSURE STATEMENT

Enclosed is Form PTO-1449, Information Disclosure Citation In An Application.

The following Patents and/or Publications are submitted to comply with the duty of disclosure under CFR 1.97-1.99 and 37 CFR 1.56.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 450, Alexandria, VA 22313-1450, on August 9, 2004.

Stephen B. Ackerman, Reg. #37761

Signature/Date 8/9/04

U.S. Patent Application HT-02-019, filed 02/20/03, Serial No. 10/371,841 now issued as U.S. Patent 6,703,654 to Horng et al., "Bottom Electrode for Making a Magnetic Tunneling Junction (MTJ)," discusses a method of fabricating a bottom electrode for magnetic tunneling junction (MTJ) devices.

U.S. Patent Application HT-02-032, filed 01/30/04, Serial No. 10/768,917 to Horng et al., "A Novel Oxidation Method to Fabricate Low Resistance TMR Read Head," discusses the use of magnetic tunnel junction (MTJ) configurations to form tunneling magnetic read heads (TMR) read heads.

U.S. Patent Application HT-03-016, filed 04/08/04, Serial No. 10/820,391 to Horng et al., "A Novel Oxidation Structure/Method to Fabricate a High-Performance Magnetic Tunneling Junction MRAM," discusses the use of an oxidation process that leads to a smooth bottom electrode and resulting superior performance properties.

A discussion of several oxidation methods can be found in Y. Ando et al., "Growth mechanisms of thin insulating layer in ferromagnetic tunnel junctions prepared using various oxidation methods, "J. Phys. D.: Appl. Phys., Vol. 35, pp. 2415-2421, (2002).

The article "Exchange-biased magnetic tunnel junctions and application to nonvolatile magnetic random access memory (invited)," by S.S. P Parkin et al., in the Journal of Applied Physics, Vol. 85, No. 8, April 15, 1999, pp. 5828-5833, establishes that exchange biased magnetic tunnel junction devices form attractive candidates for magnetic non-volatile storage elements.

The article "Progress and Outlook for MRAM Technology," by S. Tehrani et al., in IEEE Transactions on Magnetics, Vol. 35, No. 5, Sept. 1999, pp. 2814-2819, summarizes the features of existing semiconductor memories and compares them to a Magnetoresistive Random Access Memory (MRAM), a semiconductor memory with magnetic bits for nonvolatile storage.

The article "Junction area dependence of breakdown characteristics in magnetic tunnel junctions," by Kwang-Seok Kim et al., in the Journal of Applied Physics, Vol. 93, No. 10, May 15, 2003, pp. 8364-8366, discusses the breakdown characteristics of the magnetic tunnel junctions (MTJ) with different junction areas of S=200um sq. and S=0.5um sq. investigated under constant voltage stress.

U.S. Patent 6,614,630 to Horng et al., "Top Spin Valve Heads for Ultra-High Recording Density," describes a NiCr seed layer over AlO.

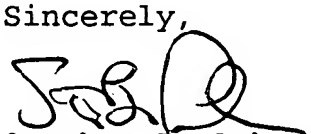
U.S. Patent 6,657,826 to Shimazawa et al., "Magnetoresistive Device and Method of Manufacturing Same, Thin-Film Magnetic Head and Method of Manufacturing Same, Head Gimbal Assembly and Hard Disk Drive," teaches Ta or NiCr under the AFM layer, then the overlying pinned layer.

U.S. Patent 6,653,704 to Gurney et al., "Magnetic Memory with Tunnel Junction Memory Cells and Phase Transition Material for Controlling Current to the Cells," discloses NiCr as a seed layer for vanadium dioxide in an MTJ cell.

U.S. Patent 6,643,104 to Shimazawa, "Magnetoresistive Effect Thin-Film Magnetic Head," discloses NiCr as an underlayer under the AFM layer and the pinned layer in a TMR device. AlO overlies the pinned layer.

U.S. Patent 6,574,079 to Sun et al., "Magnetic Tunnel Junction Device and Method Including a Tunneling Barrier Layer Formed by Oxidations of Metallic Alloys," discloses NiCr as a seed layer on the bottom lead and under the free layer in a TMR device.

Sincerely,



Stephen B. Ackerman,
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Form PTO-1449

INFORMATION DISCLOSURE CITATION IN AN APPLICATION

(Use several sheets if necessary)

Docket Number (Optional)	Application Number
HT-03-025/031	10/849,310
Applicant: Cheng T. Horng et al.	
Filing Date: 05/19/04	Group Art Unit

U.S. PATENT DOCUMENTS

	Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
	6703654	3/9/04	Horng et al.	257	295	2/20/03
	6614630	9/2/03	Horng et al.	360	324.12	4/23/01
	6605826	12/2/03	Shimazawa et al.	360	322	8/3/01
	6653704	11/25/03	Gurney et al.	257	421	9/24/02
	6643104	11/4/03	Shimazawa	360	319	7/9/01
	6574079	6/3/03	Sun et al.	360	324.2	7/13/01

FOREIGN PATENT DOCUMENTS

	Document Number	Date	Country	Class	Subclass	Translation YES	Translation NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

- Y. Ando et al., "Growth mechanisms of thin insulating layer in ferromagnetic tunnel junctions prepared using various oxidation methods," J. Phys. D.: Appl. Phys. (2002), Vol. 35, pp. 2415-2421.
- "Exchange-biased magnetic tunnel junctions and application to nonvolatile magnetic random access memory (invited)," by SS.P. Parkin et al., Jrnl. of Applied Physics, Vol. 85, No. 8, April 15, 1999, pp. 5828-5833.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.

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- "Junction area dependence of breakdown characteristics in magnetic tunnel junctions," by Kwang-Seok Kim et al., Jrnl. of Appl. Phy., Vol. 93, No. 10, May 15, 2003, pp. 8364-8366.

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	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation YES	Translation NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

- Co-pending U.S. Patent HT-02-032, Ser.# 10/768,917, filed 01/30/04, "A Novel Oxidation Method to Fabricate Low Resistance TMR Read Head", assigned to the same assignee.
- Co-pending U.S. Patent HT-03-016, Ser.#10/820,391, filed 04/08/04, "A Novel Oxidation Structure/Method to Fabricate a High-Performance Magnetic Tunneling Junction MRAM," assigned to the same assignee.

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